






# Helpful tips for viewing Meteor Showers

Watch the weather and be prepared for anything. You may encounter:

-  pop-up clouds
-  storms
-  fog in the morning
-  dew on the grass (bring boots or waterproof shoes)
-  other unexpected conditions

**Dress appropriately.** Bring layers and blankets that can be shed easily.

**Observe when the moon is in its darker phases.** The moon's glare will severely outshine faint meteors, so try to avoid the 1st & 3rd quarter when it is bright. Also, keep your area dark (no car headlights, street lamps, etc.).

**If you need lighting, use a red light.** This will allow eyes to adjust to the darkness with minimal glare. (Try putting a red bottle cap over a small flashlight.)

**Use a large open area or hill top.** A narrow field of view will offer less viewing opportunities.

**Bring food and/or drinks.** (S'mores, coffee, hot cocoa, etc)

**Bring bug spray!** (Unless you want to become dinner for the mosquitos.)

**HAVE FUN** and learn as you go. Meteor observing requires the least amount of equipment and know-how, and is a great way to spend family time or personal time.

# Ready for S'more fun?!



More outdoor fun is available through the DNR's Recreation 101 program, which provides expert instruction to budding outdoor enthusiasts by offering free, hands-on training in over 100 different activities.

Learn about participating or becoming an instructor, at [www.michigan.gov/rec101](http://www.michigan.gov/rec101).



The DNR also offers ongoing nature programming; check out the schedule at [www.michigan.gov/natureprograms](http://www.michigan.gov/natureprograms).



# Welcome to

# METEORS & S'MORES

## We hope you're ready for a

# GREAT SHOW!



## What are meteors?

Meteors are leftover material from the formation of our solar system and dust debris from comets and asteroids. When comets travel in through the inner solar system, the cosmic wind from the sun heats up the comet, helping to release water and dust particles.

## Anatomy of a meteor

Most meteors are made of common rocky type Silicates, while others are made of heavy Iron and Nickel.

## What causes a meteor shower?

As the Earth rotates around the sun, Earth's atmosphere collides with space debris that enters the atmosphere between 9 and 46 miles per second and causes the debris to burn up. This burning from the friction of the meteor colliding with air molecules can produce a very bright light of varying colors.

## Why are there so many different colors of meteors?

Different minerals will create varying colors produced by the ionization process of the meteor. White is most typical but yellow, orange, red, pink, green and blue have been observed. Atmospheric temperature can also affect the color as the meteor passes.

## Why are some meteors brighter than others?

Some meteors are bright and some dim, and this is dependant on many factors. The first reason is size. Faint meteors come from small objects that burn up faster, higher up, and are typically the size of a grain of sand or dust. Larger objects (ranging from pea-size to walnut-size) with more material to burn will usually be brighter and last longer. The longer and brighter meteors may be made of rocky Silicate material or of sturdier minerals like Iron and Nickel, which are very dense metals.

## What's the difference between a meteor and a meteorite?

A meteor only ever makes it to Earth's atmosphere, while a meteorite makes it through the atmosphere, survives impact, and reaches Earth's surface.

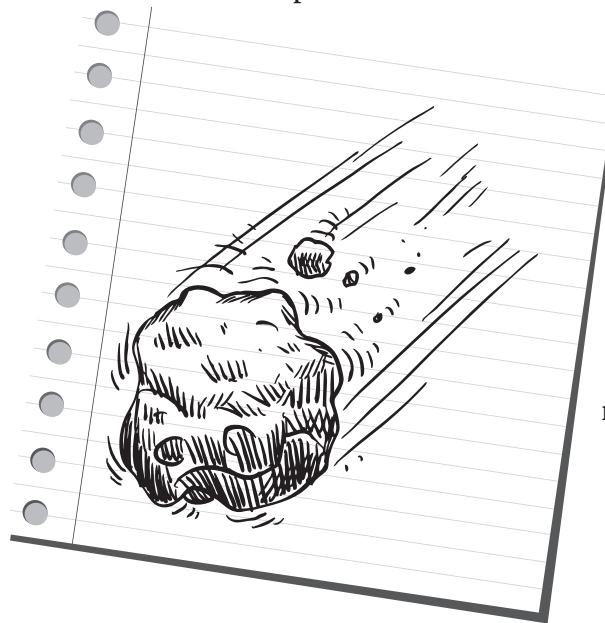
## More facts about meteors

**Smoke Trains:** Often larger meteors will leave what's called a smoke train. Smoke trains can be very long from meteors with more mass, but they can also be short. Shorter smoke trains are typically from fireballs that burn up closer to the ground. Smoke trains can last for quite a while in the atmosphere if the wind or other environmental conditions don't affect it, some lasting minutes or even hours.

**Bolides:** Pieces that fall off of a meteor as it's burning up are called bolides. Meteorites that land on Earth show evidence of this process and have areas on them that look like a piece was "scooped" out of it. These impressions are called Regmaglypts and are about the size of a thumbprint. Fireballs and bolides have also been reported to have sound.

**Oriented meteorites:** Some meteors have been reshaped to look like cones or even triangles

**Meteor Shower Names:** Meteors radiate from various regions in the sky. These radiant areas are given names which name the shower. For example, the Perseids meteor shower radiates from the constellation Perseus (Aug. 11-13), and the Leonids shower radiates from the constellation Leo. Every month of the year hosts one or more meteor showers (large or small), with many overlapping each other and sometimes spanning up to three months.



**Thanks for joining us, and we hope to see you again soon at Michigan State Parks!**